



***Grinding Aids and Customized Additives
for Cement Industry***

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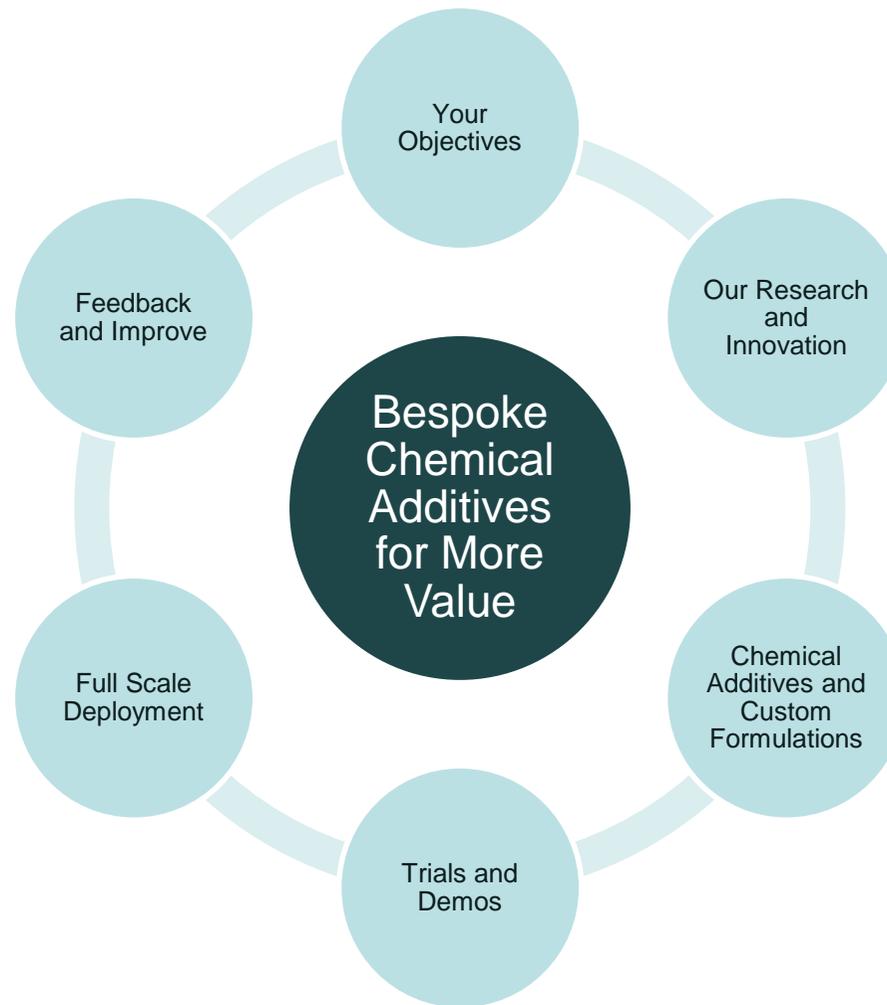
Provider of Cement Additives and Grinding Aids

- UNISOL INC was established in 2006, with the objective of formulating innovative chemical additives for cement and construction industry.
- Core team consists of:
 - Engineers from IIT Bombay and other prestigious institutes
 - Ph D and Cement Veteran
- Extended partnerships with globally leading innovators in cement and concrete additives space

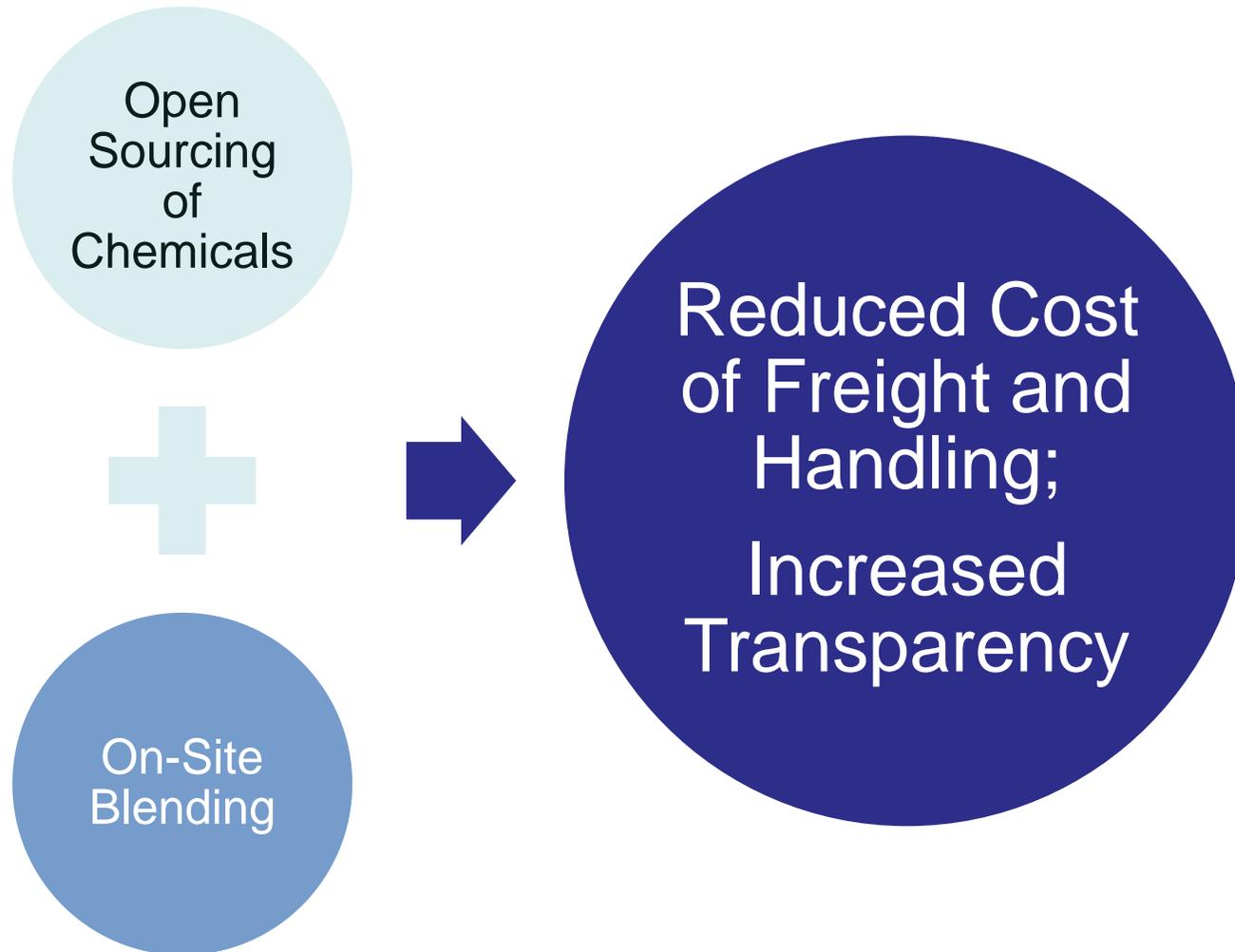
Innovation in Collaboration with Customers

- Open sourcing of chemicals and development of bespoke formulations
 - Supplying to customers in concentrated forms
 - On-site blending for reduced freight and handling costs
- Long standing relationships with many large cement producers in India.
- Aim to provide Solutions rather than Products

Aligning Our Products with Your Needs



Innovative Delivery and On-Site Blending



UNISOL – STAREX India Research Centre

- One-of-a-kind, exclusive research facility for cement industry in Noida, dedicated to development of tailored chemical additives aimed at solving real industry problems
- Being headed by Dr. S P Pandey
 - Former Head of R&D at Dalmia Cement, New Delhi
 - Former Head of R&D Centre at Ultratech Cement, Navi Mumbai
- Some illustrative cases are outlined in following slides.

1: Increased Compressive Strength

- Testing different clinkers, gypsums, fly ash, slags etc with the purpose of developing tailored strength enhancers
- Aimed at delivering custom properties for the cement plants such as:
 - Increased early age strength (1-day and 3-day)
 - Increased late age strength (7-day and 28-day)
 - Reduced water demand (NC) for increased strength performance

2: Optimized Clinker Factor

- Target reduced clinker factor while maintaining same cement strength
 - Increased fly ash in PPC
 - Increased slag in PSC
 - Increased fly ash in CC (replace slag or clinker)
- Optimize the trade-off between quality, cost and sustainability

3: Increased Cement Fineness

- Provide grinding aids for both Cement and Raw Mills
- Deliver desired fineness improvements such as:
 - Increased blaine
 - Reduced residues at 45 and/or 90 and/or 212 microns
 - Modify PSD for desired properties

4: Increased Mill Throughput

- Provide grinding aids for both Cement and Raw Mills
- Deliver:
 - Increased mill throughput
 - Reduced specific power consumption
 - Reduced wear and tear of mill equipment
 - Reduced grinding media consumption

5: Modified Setting Times

- Testing different clinkers, gypsums, fly ash, slags etc with the purpose of modifying setting times, based on the requirement of the end-market
- Possibility of reducing initial setting time by 50-100 minutes depending on the client's need.
- Other similar properties may be tested and modified.

6: Optimization of Gypsum Usage and Cost

- Testing different clinkers, gypsums, fly ash, slags etc with the purpose of optimizing gypsum costs and usage.
- Increasing usage of cheaper (such as locally available chemical gypsum) versions and replacing the more expensive imported mineral gypsums.
- Optimizing SO₃ content.

Contact Us

Corporate Office

1123-A, JMD Megapolis
Sohna Road, Gurgaon – 122018
Haryana, India
Contact # +91 98992 99905

R&D Centre

Basement, Plot # 8A, Block-HA, Sector-104,
NOIDA – 201301,
Uttar Pradesh, India
Contact # +91 98187 76996

Registered Office

412-A, Adarsh Nagar
Jaipur – 302004,
Rajasthan, India
Contact # +91 98713 46655

sales@unisolinc.in | www.unisolinc.in